WARTIME INDUSTRIAL HEALTH

Presenting a symposium of addresses—in full or in abstract—given at Institutes on Wartime Industrial Health, held in the cities of San Francisco, Crockett, Oakland, San Diego, Inglewood, Glendale, and Huntington Park, on August 18-28, 1942. Institutes were sponsored by the California State Board of Public Health, California Medical Association, and Western Association of Industrial Physicians and Surgeons.

ORIGINAL ARTICLES

OBJECTIVES OF THE INSTITUTES ON WARTIME INDUSTRIAL HEALTH*

ROBERT T. LEGGE, M. D.
Berkeley

THE Western Association of Industrial Physicians and Surgeons, at their annual meeting in May, 1942, appointed an educational committee to plan a series of institutes on industrial health similar to those held in Iowa in 1941. The California State Department of Public Health made available the necessary funds and provided personnel to assist in the organization of the Institutes. The California Medical Association, through its Committees on Postgraduate Activities and on Industrial Practice, and the county medical societies coöperated as part of their educational program.

These three important agencies, recognized as leaders in promoting public health within our State, coöperated to present this educational program in postgraduate instruction for plant and private physicians, as well as for others interested in the field of industrial medicine and hygiene.

The transformation of California from an agricultural into an industrial State as a result of the war has created boom-town industrial areas in which the facilities for housing, sanitation, and medical care are taxed to the utmost. The Army and Navy have disassociated from private practice practically all our able-bodied physicians under 40 years of age, so that it has become necessary for general practitioners not in service to take refresher courses in industrial health to keep our assembly lines at their fullest productivity.

The institutes were brought to seven centers of war industries in our State so as to afford plant, part-time, and private physicians an opportunity to attend, as well as public health officers, safety engineers, nurses, and plant managers. The program was planned to review the general principles of industrial medicine and hygiene and to give attention to the practical industrial health problems which the physician encounters in the course of his day's work.

In promoting industrial, personal, environmental, and community health, the emphasis is placed upon prevention. The main objective is to lessen the incidence and severity of accidents, occupational diseases, and the communicable diseases by making the fullest possible use of the advances made in scientific medicine and in safety engineering. Both the employer and the employee benefit by better health, greater efficiency, and increased production.

This then is the keynote of the discussions presented by my colleagues—prevention by practical and up-to-date methods of the occupational diseases, the communicable diseases, and the general illnesses which affect our working population.

6 Roble Road.

* Abstract of Chairman's address at the Institutes on Wartime Industrial Health in San Francisco, Crockett, Oakland, San Diego, Inglewood, Glendale, and Huntington Park, August 18-28, 1942.

Chairman is Professor of Hygiene, Emeritus, University of California, Berkeley, California.

INDUSTRIAL HYGIENE IN WAR PRODUCTION*

J. J. BLOOMFIELD
Washington, D. C.

THE State of California leads the Nation in the volume of war production. That single fact means that California has the same production problems as the rest of the country, only bigger and faster. Three years ago agriculture was the chief industry in California. That is no longer true. When agriculture had to drop out of number one on the California occupational parade, the rapid industrial upswing raised new problems, as is evidenced by the fact that California's accident frequency rate is at least double the percentage increase in employment.

The man—or woman—who leaves the plow to pick up the riveting gun, the monkey wrench, or the welding torch, steps into a new world. Twenty-five years ago the science of industrial hygiene might have been a pioneer in this new world, but I am happy to say that many of the charts have since been mapped, and many of the trails have since been blazed over a generation of medical, engineering, and chemical research—so that today every man whose job it is to conserve American manpower can face that job with the assurance that comes from having a reservoir of industrial hygiene "know-how" which he can tap at any time. But there is a gap between our "know-how" and the application of that slowly-

* Address presented at the Institutes on Wartime Industrial Health in San Francisco, Crockett, Oakland, San Diego, Inglewood, Glendale, Huntington Park, California, August 18-28, 1942.

From the Division of Industrial Hygiene, National Institute of Health, U. S. Public Health Service.

Author is Sanitary Engineer; Chief, States' Relations Section, Division of Industrial Hygiene, National Institute of Health, U. S. Public Health Service.

won knowledge. In its simplest terms, our job is to bridge that gap.

War, however, has brought about certain conditions which greatly complicate the problems of industrial health. Although specific defects are as varied as the enormously diversified war industries themselves, the national problem presents four broad conditions which exist to a greater or less extent in all of the 48 States. The first problem is the one which perhaps has the highest degree of visibility. I mean the control of hazards which are found in the working environment. The second group of problems are those which arise from the community environment. The third problem is the physical composition of the war labor force as compared to the peacetime labor supply, and our fourth is the shortage of trained personnel in the various professions concerned with health conservation in industry.

THE COMMUNITY ENVIRONMENT AND THE WORKER

I do not propose to discuss the first problem, hazards which are found in the working environment. However, before I leave this subject entirely, I should like to emphasize one or two important factors relating to the occupational disease problem.

To begin with, although there may be no new outstanding occupational disease problems as a result of the war, we are faced with an aggravation of the old ones on a tremendously larger scale. Because of priorities, many highly-toxic materials which had practically disappeared from industry are now back in the limelight. More private physicians with practically no experience in the field of occupational diseases are called upon to do this type of work. As a result of these various problems it is necessary, now more than ever, that physicians inform themselves concerning the occupational diseases. It is extremely important that the physicians strive to obtain an accurate occupational history of each patient, so that the factor of occupational exposure may be taken into consideration in the diagnosis and treatment of the disease from which the worker may be suffering. It is also very necessary that the medical profession assume the same attitude concerning the reporting of occupational diseases that it now does toward the reporting of communicable diseases. It is only by such a procedure that the official agency responsible for investigating and controlling an occupational disease will have the necessary information to do so.

The health problems which arise in the community stand in the same relation to health problems within the factory gates as does the nine-tenths of an iceberg which is under water to the one-tenth seen above the surface. Less than one-tenth of time lost from work is due to accidents and illness on the job. More than nine-tenths of the 400 million working days lost last year—a peacetime year of tooling-up—were due to *non*-occupational illness and injury.

The industrial hygienist is well aware that his efforts to insure a safe and healthful working environment are often nullified by unfavorable conditions in the community. A worker who is absent from his job because of a serious cold is as surely lost from the production line as though he had been disabled by an accident or an occupational disease, such as lead poisoning. Quite plainly, then, individual health—*worker's* health—and community health are so closely interwoven that one cannot be considered without the other.

The rapid expansion of war industries has had an incalculable effect upon the provision of adequate community service in many parts of the country. For example, the war contracts allotted to date have been very unevenly distributed geographically. At one time, 73 per cent of the war contracts were allotted in 20 industrial centers containing 22 per cent of the total population. The State of California is the leader among these areas, and the impact has been felt not only in tremendously increased industrial activity, but also in a severe strain upon community facilities of all sorts—transportation, schools, hospitals, medical and public health services.

As a result of war production, there is in motion a vast transmigration of workers and their families. New war plants are being built in rural areas with little thought to the provision of even rudimentary facilities, such as adequate housing, safe water, and sewage disposal. In industrial centers like those in this city, the demand for war workers has not yet reached the peak, and community health facilities in many areas are already cracking under the strain.

Under the Community Facilities Act, Congress has appropriated some $300,000,000 for the construction of schools, hospitals, water supply, sewage disposal, and other public works in war areas. This sum was about $50,000,000 short of the estimated cost of essential construction at the time of the attack on Pearl Harbor. By March 31, 1942, the U. S. Public Health Service had certified 808 health and sanitation construction projects in war areas; 612 of these had been approved by the President. Construction, however, had been started in only 172 instances, and a mere 8 projects were completed. As of June 27, 1942, California had made 396 applications for projects, estimated to cost 99 million dollars. However, only 169 of these projects had been approved by the President at that time, amounting to an estimated cost of 24 million dollars. The projects requested were mainly hospital additions, waterworks, and sanitary facilities.

With the crowding in factories, crowding in homes, crowding in transportation facilities, war industries are under constant threat of outbreaks of contagious disease among employees, which would seriously disrupt production. Every necessary precaution must be taken to avoid such an occurrence. The strengthening of general public health services in the community thus becomes an essential part of the industrial hygiene program. The industrial physician should be able to

rely upon his local health agency to fight this rear-guard action in support of his front line attack against time-loss in our war production drive. To help the States hold the line against preventable disease, the United States Public Health Service, under emergency appropriations by Congress, has recruited and trained 700 professional workers—physicians, engineers, nurses, technicians, and others—and assigned them to duty, under the direct supervision of State health departments, in 176 critical war areas.

Thus, although actual performance still falls far short of immediate needs, a good beginning has been made in the provision of minimum public health facilities in war areas. Further improvement must come, in large part, through a more realistic facing of the problem by the States and communities involved.

Crowding, poor housing, lack of sufficient medical facilities, schools, recreation, and other welfare services all combine seriously to threaten health and to disrupt normal family life. Add to these the mental strain caused by war worries, and we have a situation (under which thousands of war workers are now living) which is certainly not conducive to good morale and all-out production.

The disruption of community facilities is perhaps the first "medico-economic syndrome" to be felt in the industrial physician's practice, and equally one of the last to be recognized. Industrial medicine can no longer confine itself to emergency treatment and the diagnosis of occupational diseases. True, there is a bigger job to be done in the plant itself—that is, a job of prevention. But even this cannot be accomplished without a prompt and responsible recognition of the influence of living conditions upon absenteeism and industrial disability. This is a "total war"; half-way measures, half-way acceptance of responsibility, and a half-way concept of the job will not win. In dealing with the worker, we must adopt a concept of the "total man" if we are to keep him on the job and enable him to contribute to the common cause—his utmost in high morale, vigor and efficiency.

COMPOSITION OF THE WAR LABOR FORCE

The Honorable Paul V. McNutt, Chairman of the War Manpower Commission, reported two weeks ago that 12½ million men and women are now at work in war plants. He predicted that 5 million more workers would be needed within the next six months. By the close of 1943, these figures will undoubtedly have increased to be between 20 and 25 million workers in direct war work and essential contributory industries. More men and women will then be employed in industry than ever before in our history.

As a matter of fact, the increased employment of women is—and will be—one of the most notable changes in our industries. Thirteen million women are at work today—with the number of women in direct war work climbing toward 2 million this year, and up to 7 million—by the end of 1943.

By mental attitude and physical aptitude, women can handle many a so-called "man-size job." In one California plane plant alone, women are now handling 38 different jobs, from milling machine and turret lathe operator to sewing machine operator and parts stamper. In the entire plant there are only 9 jobs to which women definitely are not suited because of physical requirements, and five for which the required training is too long to warrant introducing women.

The employment of women, especially in the heavy industries, presents problems too numerous for discussion in the short time left. But the industrial physician must recognize the problems which exist—the 60 per cent higher morbidity rates from various nonindustrial diseases, for example—and must solve these problems promptly if womanpower is to supply its full share of war manpower.

To win the war, we must use *all* of our manpower. As a Nation we have accepted the fact that until the war is over, there will be no "business as usual" for any of us. Many peacetime standards will have to be revised. We are salvaging rubber, aluminum, copper, scrap iron, tin, so that we can meet shortages in strategic materials. Likewise, we must salvage those workers who are handicapped by both major and minor disabilities. Our physical standards for employment have been rigid and arbitrary, and, in many cases, unnecessarily high. These standards are still being applied in war plants, and valuable workers with physical defects are being turned away.

The War Manpower Commission has already discussed the possibility of calling upon management to review and adjust these standards to immediate needs. The industrial physician has a definite responsibility in influencing and guiding decisions with respect to the employment of handicapped persons. We have said for many years that the preëmployment examination *must* be used as a tool to place *all* workers—including the physically handicapped—in jobs best suited to their capacities, jobs in which performance will be at required efficiency without unusual hazard to the worker or his associates. The preëmployment examination must be used as a pre*placement* examination.

Detailed knowledge of the jobs in a given plant should be a part of the industrial physician's equipment—not merely knowledge of the number of vacancies, but of the actual operations, the potential exposures, and the required physical capacity for each operation. This kind of knowledge is not to be acquired by reading reports, but by personal study of the problem in the shop. Knowledge of the job, combined with the physician's knowledge of the human organism, will make it possible to salvage many thousands of physically handicapped workers for participation in the war production drive.

We must recognize that many of our new workers—the women, the under-draft age youngsters and the older men—are working longer and harder than they ever have before. The question of fatigue immediately arises. A tired man or woman is a potential danger to himself and his fellow workers. The increased demands for skillful and precise work mean a higher percentage of wasted efforts and spoiled critical materials from the tired worker's bench.

The Office of War Information announced on July 29 that 8 Federal agencies—War and Navy Departments, Maritime Commission, War Manpower Commission, War Production Board, the Department of Commerce, the Department of Labor and the Public Health Service—had jointly subscribed to a policy of urging a 48-hour week limit in war plants. This policy is in line with a statement issued by Surgeon General Thomas Parran seven months ago in which he pointed out that industries operating on a 24-hour basis must take special precautionary measures to minimize the effects of night work and the rotating shift. A copy of that statement is in your hands.

Also associated with fatigue is the disruption of eating and sleeping habits among workers employed on second and third shifts, especially with change of shifts occurring too frequently.

Physical fitness in the workers is the basic requirement for the reduction of lost time due to fatigue. Proper adjustment of hours, improvement of the working environment, job simplification, reduction of noise, and provision of rest periods, with supplementary feeding, will contribute to the control of fatigue.

Improved nutrition is an important factor, not only in combating fatigue, but also in promoting a higher level of health. Up to now industry has paid little attention to the nutrition of workers. Some of our newest plants are making no provision for cafeterias in the establishment, or even convenient to the plant. Great Britain has had to make the provision of eating places compulsory in all factories employing 250 or more persons. Similar action may be expected in this country if the present educational program fails to produce results.

SHORTAGE OF TRAINED PERSONNEL

Our final wartime problem—the shortage of professional personnel—makes teamwork in industrial medicine even more imperative. According to the American Medical Association, more than 20 000 additional physicians will be needed by the military services before the end of the year. Eight states, of which California is one, will have to supply nearly 16 000 of this number. Furthermore, the armed forces will need the entire First Reserve of the American Red Cross, 2 000 of whom will come from California.

Reports to the United States Public Health Service indicate that in hundreds of industrial communities the lack of doctors, dentists, nurses, is acute, and in many the situation is indeed grave. Early in February of this year, Surgeon General Thomas Parran reported that there were 1 000 vacancies for qualified physicians in State and local health departments, and 2 700 vacancies for public health nurses. In civilian hospitals, there are 10 000 vacancies for registered nurses. Individual cases have come to our attention in which the staff of industrial medical services in war plants is being depleted by the induction of personnel into the Army or Navy.

As you know, the Procurement and Assignment Division of the War Manpower Commission is pressing forward as rapidly as possible with its program for the effective utilization of the medical and dental personnel of the Nation. Even with adequate adjustment of the present situation, we must all face the fact that there will be a considerable shortage of professional personnel. The needs of our increasing Army and Navy must be met.

Nevertheless, there is a growing concern on the part of numerous war agencies and the Council on Industrial Health of the American Medical Association, lest adequate measures be not taken for the health protection of our vast industrial army. This would seem to place industrial medicine on the horns of a dilemma.

In order to help meet this problem, the Public Health Service has increased the staff of the Division of Industrial Hygiene of the National Institute of Health to 200, and has in addition employed and given special training to nearly 50 industrial physicians, engineers, and chemists who have been assigned to duty in State industrial hygiene services. Five of these are assigned to California. There is available, then, in the Federal service and in the 45 State and local industrial hygiene units, an organization of more than 500 trained professional workers capable of giving active assistance to the industrial physician. Through inspections of plants, medical and engineering consultation, and laboratory services, an effective program for the health protection of workers in individual plants is available. It only remains for these services to be more widely used by industry than they are today.

The problem of providing medical service in small plants is of increasing importance, since the allocation of Government contracts has brought many of them into the war production drive. The Council on Industrial Health of the American Medical Association, in a recent joint session with the Subcommittee on Industrial Health and Medicine of the Office of Defense, Health and Welfare Services, recommended that a program of instructing management in the advantages of medical supervision over workers be undertaken by the Government. At the subsequent meeting of the National Conference of Governmental Industrial Hygienists, the Conference recommended that a similar program be undertaken by the Public Health Service.

The answer to it all would appear to be in

organizing adequate industrial hygiene measures and maintaining the utmost vigilance. Medical, engineering, and safety personnel must constantly be aware of these problems. More than this, they must bring new problems to the attention of management and supervisory personnel, lest the pressure for high-speed production cause them to neglect the health and safety of workers, and to discount the importance of conserving our vital manpower.

Our air force has the answer for industrial medicine. We do not hear about a bomber, or a pilot, or a navigator, or a bombardier any longer. We hear about a "crew," a team—operating with incredible skill and bravery, each dependent upon the skill and loyalty of the other. The industrial physician can meet his enemy—carry out his mission—if he learns to operate as a team, drawing upon all the resources available to him. Teamwork begins in the plant, between management, labor, the medical service, the engineering service, and the employment department. Other resources should be utilized as well: the private practitioners of medicine in the community; Federal and State industrial hygiene services; local public health authorities—all should be focused upon the supreme task now before us, namely, the conservation of manpower in our war industries.

We should also utilize the worker himself in doing everything possible to maintain his physical and mental fitness so as to lessen the burden on the industrial hygienist. The labor-management committees organized in war plants by the War Production Board should be a valuable channel for the dissemination of health information and for voluntary acceptance of industrial hygiene. On July 13, 1942, 65 California plants had such committees.

We have all seen the slogan, "We have no time to lose." To that I should like to add, *we only have time to win! Time* is indeed of the essence. Time to outstrip the start which our enemies have had on us for many years. Indeed, our shortage of certain vital materials and of professional personnel are insignificant compared to our shortage of time. There is no substitute for the hours and days lost in war production because of disabling sickness. There is no substitute for the lives lost in accidents. Industrial medicine has the clear responsibility and the prodigious task of conserving every ounce of energy and efficiency in our war workers. The new and renewed problems are troublesome; but, in most instances, we have the "know-how" to meet them. War hits hard and it hits fast—in every phase of our national life. The industrial hygienist must hit first, and hit harder, if we are to give our working army the health and strength to keep 'em rolling.

U. S. Public Health Service.

In life, as in a football game, the principle to follow is: Hit the line hard!

—Theodore Roosevelt, *The Strenuous Life: The American Boy.*

INDUSTRY'S MANPOWER: ITS CONSERVATION*

CAREY P. McCORD, M. D.

Detroit, Mich.

THE true value of the trained industrial worker participating as an industrial soldier in the present emergency can be computed in various terms. However, all values are so rapidly shifting that there is no valid method of placing a monetary value on such a workman.

Of the total population of this country, there are only about 55,000,000 persons, men and women, young and old, available for all work purposes including military service. Considering the requirements for the military services, for production in war industries, for agricultural labor, and other nonmilitary but still essential activities, there is, in prospect, a deficit of nearly 6,000,000 workers. Women and old men will be called upon to make up this deficit.

It is here that the medical profession steps in. These men and women must be conserved to build more and more war materials, next week, next month, and next year. This conservation job belongs to everyone, but foremostly to the doctor, the industrial hygienist, the nurse, the public health official, the safety engineer.

Conservation of the Nation's manpower touches every physician just as war itself touches every person. In at least two senses all practicing physicians are industrial physicians. First, it should be recognized that over the country, as a whole, 80 per cent of all strictly industrial medical work is carried out by physicians not full-time or part-time salaried associates of industry. Although war will perhaps increase the percentage of medical work carried out on work premises to a figure somewhat greater than the remaining 20 per cent, this augmentation will not greatly lessen the private practitioner's dominance in this field. Not only the general practitioner, but every specialist, whether he be fully aware of it, frequently is seeing cases of total or partial employment origin.

Secondly, all physicians have been brought closer to industrial health through the realization that work injuries and occupational diseases make up only a minor portion of the health conservation problems of industry. A man or woman worker unable to perform work duties because of illness unrelated to work as the cause is just as much of a hampering influence to production as though the disease or injury had been produced on the plant's premises.

Out of an almost unlimited list of opportunities for the medical profession to wield an influence helpful to the conservation of the Nation's man-

---

* Abstract of address presented at the Institutes on Wartime Industrial Health in San Francisco, Crockett, Oakland, San Diego, Inglewood, Glendale, and Huntington Park, August 18-28, 1942.

Author is Medical Advisor, Chrysler Corporation; Medical Director, Industrial Health Conservancy Laboratories; Director, American Association of Industrial Physicians and Surgeons.